MASTER OF SCIENCE
IN
INFORMATION TECHNOLOGY MANAGEMENT

INFORMATION SYSTEMS STRATEGIC PLANNING FOR KOSOVO PEACEKEEPING FORCE

Nuh Altinsoy-First Lieutenant, Turkish Army
B.S., Turkish Military Academy, 1996
Master of Science in Information Technology Management-September 2001
Advisors: William J. Haga, Graduate School of Business and Public Policy
John Osmundson, Department of Information Sciences

This thesis presents a model of a detailed strategic information plan for a military organization. The model includes the analysis and design of a network and a three-tier client server system. The network analysis focuses on the network traffic flow using Ethernet and Token Ring models. Each candidate technology is simulated with Extend 4.0. Average latency and waiting time in the queue are the simulation parameters. The selection of the candidate technology will play an important role in the implementation of the intranet for the organization.

The three-tier client/server system includes the design and implementation of a relational database, which is connected to the intranet. The database is created with Access 2000. The database connectivity from back-end to front-end is constructed by Active Server Pages (ASP), which enables the users to manipulate the database via their web browsers. The intranet pages are built with Microsoft Front Page 2000. This prototype will permit this organization to initiate a transformation from paper-based environment to the paperless world.

DEVELOPMENT OF THE MARINE INFORMATION PORTAL THROUGH INFORMATION MANAGEMENT ON THE WORLD WIDE WEB

Sherman L. Bierly-Major, United States Marine Corps
B.S., Ohio State University, 1985
Master of Science in Information Technology Management-September 2001
and
Martin J. Burns-Major, United States Marine Corps
B.S., Southern Illinois University, 1985
Master of Science in Information Technology Management-September 2001
Advisors: LtCol Terrance Brady, USMC, Graduate School of Business and Public Policy
Magdi Kamel, Department of Information Sciences

The Marine Information Portal (MIP) research project will systematically develop a Web-based information portal that will support Naval Postgraduate (NPS) Marine students in pursuit of a graduate education. This portal will be based on the precept that the needs of the Marine student community can be better served by the creation of a multifaceted Website geared to their specific information requirements.

The MIP will provide information about the NPS, surrounding communities, professional USMC information, Marine student personal information, and support communication between students, thesis sponsors, the SEP assignment monitor, and the NPS Marine Corps Representative.

The development process will involve planning, requirements identification, design, and implementation. In support of requirement identification, a prototype website with a web-enabled database

will be developed, and Marine students will be administered a questionnaire survey. Information will be gathered, consolidated, analyzed, and when appropriate, incorporated into the final site design. The database will include student contact information, as well as thesis information. The database will help enhance student and staff communication, as well as align thesis research with students' follow-on duty assignments. Finally, as a Marine officer, an NPS student, and member of the local community, the NPS Marines will have a Web site primarily focusing on effectively meeting their information needs.

WEB-BASED INFORMATION MANAGEMENT SYSTEM FOR THE INVESTIGATION, REPORTING, AND ANALYSIS OF HUMAN ERROR IN NAVAL AVIATION MAINTENANCE

Anthony R. Boex-Commander, United States Navy
B.S., University of Washington, 1985
Master of Science in Information Technology Management-September 2001
Advisors: CDR John K. Schmidt, USN, School of Aviation Safety
George A. Zolla, Department of Information Sciences
Robert C. Figlock, School of Aviation Safety

The purpose of this thesis is to examine the development of a Web application to display, analyze, and produce reports of human error involvement and patterns in aviation maintenance mishaps. The Human Factors Analysis and Classification System-Maintenance Extension (HFACS-ME) taxonomy, a framework for classifying and analyzing the presence of maintenance errors that lead to mishaps, is the foundation of this tool. The target audience for this tool includes safety and maintenance personnel, mishap investigators, and safety analysts. A review of five areas is needed to produce the Web-based prototype: (1) client/server architectures, (2) database management systems, (3) Web application design, (4) application coding, and (5) usability considerations for a Web/database tool. Collectively, these topics provided a foundation to develop an effective and user-friendly prototype, referred to as HFACS-ME Web. A usability study was conducted using potential end-users. The participants were given both written procedures to navigate through the prototype and an exit survey. The results of the survey, including objective and subjective responses, indicate strong user support for the HFACS-ME Web prototype in concept and implementation and suggest that the training and analysis capability it provides may contribute to a reduction in maintenance errors and ultimately a decreased mishap rate.

INTEGRATION OF THE USMC AAAV(C) C4I SYSTEM ARCHITECTURE AND STAFF TRAINING REQUIREMENTS

Dwayne K. Cannion-Major, United States Marine Corps
B.S., Embry-Riddle Aeronautical University, 1988
Master of Science in Information Technology Management-September 2001
Advisors: John S. Osmundson, Department of Information Sciences
Gary R. Porter, Department of Information Sciences

The Advance Amphibious Assault Vehicle (AAAV) is new technology and it has the potential to change the way the Marine Corps conducts amphibious and mechanized operations. The AAAV(C) is the command variant and its primary mission is to provide a Command and Control (C2) platform capability to the battalion and regiment level. The command, control, communications, computers, and intelligence C4I system to be employed on the AAAV(C) is making use of the latest technology in computer hardware and software, radio communications, and wireless data transfer.

In order to take advantage of this robust system, the user is going to need to be trained. The more experienced and familiar the user is with the applications, the better they can assist the commanding officer in exercising C2 over the battlefield. The training of the staff officer is essential and must start early. In this thesis several additions to current USMC training requirements have been identified and recommended for inclusion in future training courses.

SURVEY OF EMERGING WIRELESS/PCS TECHNOLOGY AND THE IMPLICATIONS ON FUTURE MILITARY TACTICAL COMMUNICATIONS

Charlotte J. Carpenter-Captain, United States Marine Corps
B.A., Oregon State University, 1995
Master of Science in Information Technology Management-September 2001
Advisors: R. Clark Robertson, Department of Electrical and Computer Engineering
Floyd J. Brock, Department of Information Sciences

This research evaluates the wireless technologies that are currently available in the commercial sector or that are in development. The objective is to evaluate the suitability of using the technologies as a viable communication vehicle for the United States Marine Corps, specifically for use by the Intelligence and Information Operations communities. Subjects addressed include cellular/personal communications services (PCS) technology currently available and in development. Also included are potential applications by the USMC, strengths and limitations as they relate to Intelligence and Information Operations, and relationships of cellular and PCS technologies. As a final point, recommendations for categorization of cellular/PCS technologies by radio frequency spectrum and wireless service are incorporated.

COMPARISON OF DEPARTMENT OF DEFENSE INFORMATION TECHNOLOGY ACQUISITION PROCESSES: A CASE STUDY

Sean P. Dehlinger-Captain, United States Marine Corps
B.A., Washington State University, 1994
Master of Science in Information Technology Management-September 2001
Advisors: Roger Evered, Graduate School of Business and Public Policy
Glenn Cook, Department of Information Sciences

This thesis presents a comparison and analysis of two Department of Defense (DoD) acquisition methods: the formal acquisition process and the Advanced Concept Technology Demonstration (ACTD). Both processes can be, and are, used by DoD to acquire information technology (IT), but while DoD has utilized the formal acquisition process for 30 years, the ACTD process is only six years old, and was specifically designed to improve upon the standard acquisition process (when applied to IT). By describing and studying the events surrounding, actors participating in, and results of one ACTD, this thesis will determine what lessons-learned can be applied to the standard acquisition process. While the ACTD and acquisition processes share some similarities in their management and funding, there are also significant differences. For example, ACTDs gain approval through a completely different process than acquisitions, and are subjected to less bureaucratic oversight. The recommendations provided in this thesis indicate that, based upon the experiences of the real-life ACTD sampled, the ACTD process does represent an improvement upon the standard acquisition process, specifically when the standard process is utilized to acquire IT.

BUSINESS PROCESS REDESIGN IN MARINE CORPS RECRUITING WITH VISUAL MODELING AND SIMULATION

David G. DiEugenio, Jr.-Major, United States Marine Corps
B.S., United States Naval Academy, 1988
Master of Science in Information Technology Management-September 2001
Advisors: Magdi N. Kamel, Department of Information Sciences
Mark J. Eitelberg, Graduate School of Business and Public Policy

The goal of the thesis is to identify information flow tasks in the current Marine Corps enlisted recruiting system presenting an opportunity for gains in efficiency through the application of information technology. This thesis presents an overview of the recruiting process, including the mission, target market, players, and business rules. The recruiting business model is decomposed into its components, and information flow through each component is further examined. Graphic models are created using Extend™ visual modeling and simulation software to establish a direct labor cost-per-task measure for the current or "As Is" system. "As Is" data are generated and recorded for each of the information flow tasks to be evaluated. Considering applications of information technology that may improve information flow tasks, future or "To Be" models

are applied to the respective tasks and data are collected and recorded. Cost-per-task data for the "As Is" and "To Be" models are compared, and potential efficiencies gained are noted. The results of the comparison show that significant gains in efficiency are possible by applying information technology solutions to reduce redundant data entry and other burdensome administrative tasks.

RECOMMENDING POLICY AND OPERATING PROCEDURES FOR STEALTHY INTRUSION DETECTION NETWORKS (SIDN) IN THE DEPARTMENT OF THE NAVY

Andrew C. Escriva-Lieutenant Commander, Unites States Navy
B.S., United States Naval Academy, 1989
Master of Science in Information Technology Management-September 2001
Advisors: Kristen Tsolis, Department of Information Sciences
Alex Bordetsky, Department of Information Sciences
LtCol Charles Williamson, USMC, Office of the Chief of Naval Operations

Stealthy Intrusion Detection Networks (SIDNs) are useful tools that assist computer security professionals improve computer network defense (CND.) There have been questions as to whether or not the Department of the Navy can conduct SIDN research and if so what are appropriate uses for the data and with whom can DoN share it. The goal of the thesis is to explore existing laws pertaining to operating SIDN, and their relevant policies. This thesis analyzes the three entities currently conducting honeynet research in the United States and presents recommended operating procedures and policy for Department of the Navy honeynets including interaction with civilian authorities.

The conclusions drawn from this research indicate that DoN can lawfully conduct the research and recommends methods for interacting with law enforcement and incident handling.

A NAVAL SPECIAL WARFARE CONCEPT OF OPERATIONS FOR THE MOBILE EXPLORATION SYSTEM (MEX) IN A NETWORK CENTRIC ENVIRONMENT

Darin A. Evenson-Lieutenant, United States Navy
B.S., United States Naval Academy, 1994
Master of Science in Information Technology Management-September 2001
Advisors: Carl R. Jones, Department of Information Sciences
Charles M. Racoosin, Naval Space Systems Academic Chair

The development of wireless local area networks (WLANs) has greatly accelerated the commercial development of wireless technology for enterprise network solutions. Government and military organizations are also benefiting from the competition and interoperability fostered by the new marketplace. Given the decreasing cost, and increasing capabilities of WLANs, military units could soon adopt commercial WLANs as the networks of choice for combat operations. This trend will facilitate the realization of Network Centric Operations (NCO).

Wireless technology availability, coupled with the US military's trend of looking to commercial-off-the-shelf (COTS) communication and computing solutions, necessitate an awareness of the characteristics of WLANs. The capabilities of the WLAN technology will influence the Concept of Operations (CONOPS).

This thesis researches and conducts an analysis of a mobile WLAN at the NASA Ames Research Center in Moffett Field, California, called the Mobile Exploration System (MEX), developed as a test bed for future planetary exploration concepts. This thesis determines the types of WLAN technologies that could be implemented in Naval Special Warfare (NSW) operations in a network centric context and proposes a CONOPS. Finally, the thesis provides a cost-benefit framework for analyzing the application of WLAN technologies to NSW mission areas.

FEASIBILITY OF THE TACTICAL UAV AS A COMBAT IDENTIFICATION TOOL

Michael P. Farmer-Major, United States Army
B.S., University of North Alabama, 1990
Master of Science in Information Technology Management-September 2001
Advisors: John Osmundson, Department of Information Sciences
William J. Welch, Department of Computer Science

Soldiers maneuvering on the 21st Century battlefield are issued state-of-the-art equipment. Despite this, the tools at their disposal to identify targets as being a "friend" or a "foe" have changed little since Operation Desert Storm. While improved optics on late model combat systems are extending gunners' abilities to identify targets at extended ranges, an optics-vs.-ballistics gap remains in the majority of U.S. Army ground maneuver forces. This gap, and other battlefield factors, increases the likelihood of fratricides in combat.

This thesis examines the feasibility of using the Army's Tactical Unmanned Aerial Vehicle (TUAV) as a combat identification (CID) tool for troops at the tactical level. Three scenarios were modeled and multiple simulations run to identify potential problems in using the TUAV as a CID tool, as well as ways to improve the system if it is used in this role. Model considerations included current and planned future datalink bandwidths, system delays, normal vs. immediate taskings, and travel times to mission areas.

The thesis demonstrates that if TUAVs are properly integrated into tactical mission planning and imagery analysts possess the necessary level of vehicle identification training (to include thermal identification training), the TUAV can function well as a CID tool.

DESIGN OF MOBILE USER OBJECTIVE SYSTEM (MUOS) HELMET MOUNTED UHF ANTENNA

David S. Gibbs-Captain, United States Marine Corps
B.S., Pennsylvania State University, 1993
Master of Science in Information Technology Management-September 2001
Advisors: Jovan Lebaric, Department of Electrical and Computer Engineeering
John Osmundson, Department of Information Sciences

The Mobile User Objective System (MUOS) is the Navy's next generation narrowband tactical communication system that will provide a significant increase in capacity and link availability to disadvantaged users, including handheld terminals. Future MUOS antennas will have a receive band of 243 MHz – 270 MHz and a transmit band of 292 MHz – 317 MHz with a voltage standing wave ratio (VSWR) of less than three across both bands. Additionally, the antenna must have a nearly omni-directional radiation pattern above 10 degrees in elevation, be conformal to a US military helmet and have a low profile. In this thesis an antenna was designed that is capable of operating over the entire band 243 MHz to 317 MHz. The antenna performance was optimized for its design restrictions. The antenna was designed and its performance predicted using Ansoft's High-Frequency Structure Simulator (HFSS). The HFSS is based on the Finite-Element Method (FEM).

WIRELESS TECHNOLOGY VIA SATELLITE COMMUNICATIONS FOR PEACEKEEPING OPERATIONS

Andre T. Harrell-Captain, United States Marine Corps
B.S., Jacksonville University, 1993
Master of Science in Information Technology Management-September 2001
Advisors: Tri T. Ha, Department of Electrical and Computer Engineering
Nancy Roberts, Graduate School of Business and Public Policy

How can reliable information be shared amongst international, military, and non governmental organizations in support of peacekeeping operations? This thesis examines a wireless alternative to enhance existing communication infrastructures as a primary means of information exchange. When assessing the need for wireless and making a determination of its use, a study of its markets, trends, future growth, policies, and regulations must be taken into consideration. Wireless technology via satellite

communications can offer a great advantage of information exchange for mobility-deployed organizations requiring extensive geographical coverage such as peacekeeping operations. With the emergence of higher transmission rates and technological options (i.e. video conferencing, Wide Area Networking, internet accessibility, voice/fax/data transfer, etc.) for satellite communication, the examination of wireless technology and the options it presents becomes paramount. Peacekeeping efforts involve the coordination and collaboration of civilian/military organizations that depend exclusively on information exchange for rapid response and operational readiness. The use for wireless as a necessary communication requirement will aid in the achievement of these objectives.

IMPLICATIONS OF USER IDENTIFICATION DEVICES (UIDS) FOR THE UNITED STATES NAVY

Letitia D. Haynes-Lieutenant Commander, United States Navy
B.S., University of Central Florida, 1987
Master of Science in Information Technolology Management-September 2001
Advisors: Cynthia Irvine, Department of Computer Science
Tim Levin, Department of Computer Science

Various technologies are emerging to provide enhanced, automated personnel identification capabilities. Techniques for human microchip implants using radio frequency identification are possible, but the implications of this technology remain to be considered. This thesis provides a survey of current technologies for enhanced user identification, focusing on human implant approaches, and to summarize the set of security, privacy, social and ethical issues that may arise from the use of these technologies in the U.S. Navy. Technical background is presented to provide the reader with a basic understanding of radio frequency technology. An analysis of human implant technologies currently used in the private sector is provided to show how they might offer capabilities in the military. Applications of information technology and human microchip implants that may improve user identification in the future are presented and analyzed. Finally, a review of the social and ethical implications of human implant-based user identification is provided. It shows that the collateral social issues are complex and far-reaching, and need to be carefully considered by the Navy to avoid becoming entangled in intractable technical, morale and legal issues far into the future. The results of this exploratory thesis show: 1) implementation of advanced information technology devices must be carefully balanced against human social and ethical considerations, and 2) there is a valid need for future research and analysis of human microchip implants.

INTEGRATION OF PERSONAL DIGITAL ASSISTANT (PDA) DEVICES INTO THE MILITARY HEALTHCARE CLINIC ENVIRONMENT

Jason Keltner-Lieutenant, United States Naval Reserve
B.S., University of La Verne, 1989
M.B.A., University of La Verne, 1991
Master of Science in Information Technology Management-September 2001
and
Paul Miller-Lieutenant, United States Navy
B.A., Rutgers University, 1989
M.H.A., St. Joseph's University, 1982
Master of Science in Information Technology Management-September 2001
Advisors: Carl Jones, Department of Information Sciences
Donald Brutzman, Department of Information Sciences

The business drivers within managed care are mandating that physicians have point-of-care access to medical reference data, patient specific data, formularies, treatment protocols, and billing/coding information. One emerging technology that has the potential to provide this access with little economic investment is the mobile Personal Digital Assistant. The authors address a variety of wireless technologies and security concerns regarding real-time access to patient data. The family practice staff at the Naval Hospital Lemoore explored and contrasted the capabilities of commercially available PDAs, wireless interfaces, and medical software applications to ascertain their value within the Military Health System. A production-ready interface between the Composite Health Care System and the Nutrition Management

Information Server demonstrates the potential for eliminating the difficulties associated with documenting patient encounters and capturing charges. Survey tools generate a requirements standard for deployment of this technology within the Military Health System on an enterprise-wide scale with a hybrid approach to packaging based on functionality. The authors recommend the Military Health System embrace this technology as a means to realize its vision of best value health services.

THE USE OF KNOWLEDGE-BASED DECISION SUPPORT SYSTEMS IN RE-ENGINEERING SELECTED PROCESSES IN THE U.S. MARINE CORPS

Holly N. Korzilius-Captain, United States Marine Corps
B.M.A., University of Michigan, 1994
Master of Science in Information Technology Management-September 2001
Advisor: Mark E. Nissen, Graduate School of Business and Public Policy
Erik Jansen, Graduate School of Business and Public Policy

In light of the continued investment in information technology by businesses in hopes of achieving a measurable benefit in terms of process efficiency and effectiveness, business process re-engineering (BPR) is becoming increasingly important. BPR suggests that by radically redesigning underlying business processes, companies can achieve breakthrough improvements in productivity. BPR, however, is a knowledge intensive endeavor. A decision support tool called KOPeR-lite was developed with the intent of encoding the knowledge held by BPR experts and documented in BPR literature. This tool promises to assist BPR novices who are tasked with re-engineering inefficient or ineffective processes. The purpose of this thesis is to determine the viability of using KOPeR-lite when BPR novices undertake process re-engineering projects. It also proposes re-engineering solutions for the permanent change of station orders

process for USMC officers, which will be presented to the leadership in the Headquarter, U.S. Marine Corps (HQMC) Manpower and Reserve Affairs (M&RA) branch. If adopted, one of the proposed solutions promises to dramatically improve process performance.

A DATA WAREHOUSING AND OLAP APPLICATION FOR THE NAVAL RESERVE FORCE (CNRF) ASSESSMENT PROCESS

Scott A. Langley-Lieutenant Commander, United States Naval Reserve
B.S., United States Naval Academy, 1986
Master of Science in Information Technology Management-September 2001
Advisors: Dan Dolk, Department of Information Sciences
Magdi Kamel, Department of Information Sciences

The Naval Reserve Force has identified a need to pool the data from its many legacy database systems into a single, useable data warehouse. The current system uses separate legacy databases and formatted reports to provide a manual decision process. Under the leadership of Rear Admiral John Totushek, the Naval Reserve Force is driving many technological revolutions via the Leading Change initiative. One of the key goals of the Leading Change initiative is a strategic decision support tool. To support this goal, Naval Reserve Force Assessment Division elected to fund a project to provide a prototype data warehouse and Online Analytical Processing (OLAP) solution to the problem. The Naval Reserve Strategic Decision Support Tool (NaRSDAT) is the result. The NaRSDAT development of this thesis provides an in depth evaluation of the existing databases. It then provides an object oriented development approach to a relational data warehouse and a star schema development for data mining. NaRSDAT employs Microsoft Visual Basic, Microsoft Access, and Cognos PowerPlay to provide a complete data warehouse and OLAP solution. The NaRSDAT prototype will serve as the basis for a comprehensive knowledge management solution for the Naval Reserve Force.

INTRUSION DETECTION SYSTEMS REQUIREMENTS ANALYSIS: AN EVALUATION OF THE MARINE CORPS' USE OF COTS IDS

Jorge E. Lizarralde-Major, United States Marine Corps
B.S., University of Colorado, 1988
Master of Science in Information Technology Management-September 2001
Advisors: Daniel F. Warren, Department of Computer Science
John S. Osmundson, Department of Information Sciences

Intrusion detection systems (IDS) have become a major tool in the defense of computer networks throughout DoD. However, in the past, the purchase of these tools has been based on little more than vendor literature. This thesis applies Joseph Barrus' requirements model to the current Commercial-Off-The-Shelf (COTS) IDS deployed on the Marine Corps Enterprise Network (MCEN) and determines if the current IDS meets the Marine Corps' requirements. To make this determination, this thesis looks at three questions: what are the requirements for an intrusion detection system, how are those requirements measured and can they be measured? This thesis also looks at the MCEN in detail and concludes that the centralized control and management of the MCEN allows the Marine Corps to use other resources to make-up for the deficiencies of an average COTS product. Lastly, the thesis addresses the state of intrusion detection standards and certified evaluations of IDS. Standardization, when approved, gives the Marine Corps more flexibility in selecting security products that complement the MCEN operating environment. Certified evaluations by accredited laboratories ensure that companies and organizations can purchase security products with a greater degree of confidence that they will function according to an established assurance level.

REORGANIZATION OF THE MARINE AIR COMMAND AND CONTROL SYSTEM TO MEET 21ST CENTURY DOCTRINE AND TECHNOLOGY

John C. Madsen-Major, United States Marine Corps
B.S., Central Michigan University, 1989
Master of Science in Information Technology Management-September 2001
Advisors: Frank J. Barrett, Graduate School of Business and Public Policy
Erik Jansen, Department of Information Sciences

The Marine Air Command and Control System (MACCS) is at a crossroad for organizational change. New and emerging war fighting doctrine, which places an emphasis on joint and small contingency operations, as well as new technology, requires that the MACCS review how it is organizationally structured. Within the next few years, the Marine Corps will field the Common Aviation Command and Control System (CAC2S). CAC2S is designed to be a singular tactical system for all functional agencies within the Marine Air Control Group (MACG). Unique systems, which were in the past tailored for the specific missions, will be eliminated with the fielding of CAC2S. CAC2S will allow the MACCS to operate in a manner that could not be achieved when the MACCS was first formed during the 1960s. Many sources in the Fleet Marine Force and the support establishment recognize that the MACCS must reorganize in order to operate and function effectively within the confines of this emerging 21st century technology and doctrine. Parallels exist between how industry and business reorganize when introduced to new technologies and business doctrine, and the military. Organizational restructuring is something that must be carefully considered and planned, for it is most often resisted by the members and stakeholders of an organization. Overcoming the barriers and resistance to change requires formal models of change be implemented. Technology alone cannot increase or improve an organization's productivity. Only through formal restructuring can an organization such as the MACCS hope to remain essential to the mission of the Marine Corps.

INFORMATION MANAGEMENT SYSTEM FOR ELECTRONIC VOTING IN SUPPORT OF THE SCHIEFFELIN AWARD FOR EXCELLENCE IN TEACHING

Samuel A. Magliano-Major, United States Marine Corps
B.S., Oregon State University, 1989
Master of Science in Information Technology Management-September 2001
Advisors: Daniel R. Dolk, Department of Information Sciences
Dennis R. Mar, Information Technology

The purpose of this research was to evaluate, automate, refine and develop a management information system that facilitated data collection, organization, query, analysis, and counting of ballots submitted over the Internet/Intranet with regard to the Rear Admiral John J. Schieffelin Award for Excellence in Teaching. Research included conducting a detailed analysis of the current system (re-engineering), preparing hardware and software requirements for an automated system, determining security requirements for an Intranet based voting system and implementing a prototype to demonstrate feasibility. The "Rear Admiral John J. Schieffelin Award for Excellence in Teaching" has traditionally been a manual system interwoven with several legacy systems that make analysis, voter response and data collection difficult. Development of an Internet/Intranet based information system coupled with a decision support system for statistical analysis, streamlines the flow of information, thus allowing for more robust analysis/querying as well as possibly increasing voter response by providing a friendly user interface that allows quick and easy ballot submissions.

COLLABORATIVE PLANNING SOLUTIONS: USING USMC STANDARD COLLABORATION TOOLS TO ASSIST WITH MISSION PLANNING AND EXECUTION

Heidi J. McKenna-Captain, United States Marine Corps
B.B.A., University of Hawaii, 1991
Master of Science in Information Technology Management-September 2001
Advisors: Douglas E. Brinkley, Graduate School of Business and Public Policy
Floyd J. Brock, Department of Information Sciences

This study provides a baseline on collaborative solutions and tools. This thesis examines the current collaborative applications used within the United States Marine Corps (USMC). It demonstrates the strengths and weaknesses inherent to the current collaborative tool set used within the USMC. Additionally, this research examines how collaborative applications can effectively enhance information sharing during mission planning and execution, as well as increase productivity. A key to efficient planning and execution today is to find a seamless application that is standard throughout the entire Marine Corps and that is easy for the users to embrace. Findings indicate that collaborative tools can be highly effective if properly applied to the correct process. Recommendations for the future include finding a Web-based, data-driven application such as Microsoft Sharepoint Portal Server 2001. It combines the ability to easily create corporate Web portals with document management, enterprise content indexing, and team collaboration features.

IMPLEMENTING THE NAVAL POSTGRADUATE SCHOOL'S SECURITY POLICY USING WINDOWS 2000

David R. McKinley-Lieutenant Colonel, United States Marine Corps
B.A., Indiana University, 1983
Master of Science in Information Technology Management-September 2001
Advisors: Paul Clark, Department of Computer Science
William Haga, Graduate School of Business and Public Policy
Doug Brinkley, Graduate School of Business and Public Policy

When the Naval Postgraduate School (NPS) fully migrates to Microsoft Windows 2000 as the primary operating system on desktop PCs and servers, security configuration will be a major concern. Windows 2000 provides a consolidated tool set as a means to securely configure these systems. It also provides a pre-configured list of security templates that may be applied when initially configuring different types of systems. The purpose of this thesis is to provide: (1) brief overview of the Microsoft Windows 2000 security architecture, (2) a description of the Windows 2000 Security Configuration Tool Kit and how to configure security settings, (3) a discussion on security policy and how it effects security configurations, (4) recommendations on how to translate the Naval Postgraduate School's Security Policy into Windows 2000 security settings, and (5) recommendations on a pre-configured, security template for all students attending NPS.

LESSONS FROM ENTERPRISE SYSTEM IMPLEMENTATIONS APPLIED TO THE MARINE CORPS TOTAL FORCE ADMINISTRATION SYSTEM

Keith F. Moore-Captain, United States Marine Corps
B.A., Morehouse College, 1992
Master of Science in Information Technology Management-September 2001
Advisor: Rex Buddenberg, Department of Information Sciences

The United States Marine Corps is implementing a new human resource system called the Total Force Administration System (TFAS). Enterprise and Enterprise Resource Planning (ERP) System implementations are reputed to be difficult because of the problems encountered by corporate America in the late 1990s. This thesis conducted a review of corporate enterprise system implementations looking for commonality in two areas: the most frequent problems encountered and key success factors. This thesis provides the TFAS leadership with issues of concern that require greater attention or research and with key success factors for the TFAS implementation. This thesis also reviewed and analyzed the preliminary architecture for the TFAS project.

By leveraging the lessons learned from other implementations, it is hoped to increase the chances of success for this project and minimize implementation pain.

USING NETWORK MANAGEMENT SYSTEMS TO DETECT DISTRIBUTED DENIAL OF SERVICE ATTACKS
Chandan Singh Negi-Lieutenant, Indian Navy
B. Tech., Jawaharlal Nehru University, India, 1994
Master of Science in Information Technology Management-September 2001
Master of Science in Computer Science-September 2001
Advisors: Alex Bordetsky, Department of Information Sciences
Paul Clark, Department of Computer Science

Distributed Denial of Service (DDoS) Attacks have been increasingly found to be affecting the normal functioning of organizations causing billions of dollars of losses. Organizations are trying their best to minimize their losses from these systems. However, most of the organizations widely use the Network Management Systems (NMS) to observe and manage their networks. One of the major functional areas of a NMS is Security Management. This thesis examines how the Network Management Systems could aid in the detection of the DDoS attacks so that the losses from these could be minimized. The thesis details the SNMP MIB variables of importance for detecting these attacks and the MIB signatures of the specific attack.

INFORMATION MANAGEMENT SYSTEM DEVELOPMENT FOR THE INVESTIGATION, REPORTING, AND ANALYSIS OF HUMAN ERROR IN NAVAL AVIATION MAINTENANCE
Douglas B. Nelson-Captain, United States Marine Corps
B.S., St. Cloud State University, 1992
Master of Science in Information Technology Management-September 2001
Advisors: John K. Schmidt, School of Aviation Safety
Robert C. Figlock, School of Aviation Safety
George A. Zolla, Department of Information Sciences

The purpose of this research is to evaluate and refine a safety information management system that will facilitate data collection, organization, query, analysis and reporting of maintenance errors that contribute to Naval Aviation mishaps, equipment damage and personnel injury using OPNAV 3750.6R, Human Factors Analysis and Classification System Maintenance Extension taxonomy. The target audience for this information management system tool included safety personnel, mishap investigators, Aircraft Mishap Board (AMB) members, and analysts. A review of three areas was needed to refine the prototype tool: (1) the collection, use and management of accident information, (2) human error theories as related to aviation mishaps and (3) the design of an effective mishap database tool. A usability study was conducted using potential end-users. Fifteen Naval Aviation Safety Officers and Naval Aviators were given written procedures to navigate through the prototype and an exit survey. The survey responses, including objective and subjective responses about the prototype were gathered. The results indicate, that with proper training, the prototype could provide insight into maintenance errors, which could be used to target hazards and develop intervention strategies to prevent future mishaps.

SCENARIO AUTHORING AND VISUALIZATION FOR ADVANCED GRAPHICAL ENVIRONMENTS (SAVAGE)

Shane D. Nicklaus-Major, United States Marine Corps
B.S., University of Southern California, 1991
Master of Science in Information Technology Management-September 2001
Advisors: Don Brutzman, Department of Information Sciences
Curtis Blais, Institute for Defense Systems Engineering and Analysis
Dan Boger, Department of Information Sciences

Today's planning and modeling systems use two-dimensional (2D) representations of the three-dimensional (3D) battlespace. This presents a challenge for planners, commanders, and troops to understand the true nature of the battlespace. This thesis shows how 3D visualization can give both operation planners and executors a better understanding of the battlespace that can augment today's 2D systems. Automatic creation of a 3D model for an amphibious operation allows the planner to view an operation order as a whole, from different perspectives. Recommended changes can be made and their effects immediately known. Warfighters can use the same tools for mission preparation and review.

The United States and NATO nations use the Land C2 Information Exchange Data Model (LC2IEDM), formally known as the Generic Hub, as a common method for exchanging data between independent systems. As part of the Scenario Authoring and Visualization for Advanced Graphical Environments (SAVAGE) project, this research presents an integrated Web access and 3D visualization strategy for Department of Defense (DOD) tactical messaging and operation orders using the Generic Hub data model and the Extensible Markup Language (XML). A number of alternative yet consistent ways to represent an amphibious operation scenario demonstrate the power, flexibility and scalability of the SAVAGE approach.

POTENTIAL VULNERABILITIES OF A USMC TACTICAL WIRELESS LOCAL AREA NETWORK

John P. O'Sullivan-Commander, United States Navy
B.S., United States Naval Academy, 1984
Master of Science in Information Technology Management-September 2001
Advisors: John Osmundson, Department of Information Sciences
LT Raymond Buettner, USN, Department of Information Sciences

As part of the ongoing Revolution in Military Affairs, the Navy and Marine Corps are engaged in an ambitious effort to integrate emerging technologies into new operational concepts. The vision of future conflict places heavy emphasis on highly mobile forces that will require unprecedented cooperation between forces afloat and ashore. These new operational concepts, such as Operational Maneuver From the Sea (OMFTS), require new technologies to give small combat units unmatched situational awareness ultimately leading to greater combat power. The Extending the Littoral Battlespace (ELB) Advanced Concept Technology Demonstration has sought to demonstrate new advances in joint expeditionary warfare significantly aided by a commercial-off-the-shelf wireless communications system.

This thesis examines potential vulnerabilities of the ELB wireless local area network. Specifically, it explores the impact such vulnerabilities may have on the eventual ability of supported units to accomplish their mission in an OMFTS-type scenario. The vulnerabilities are divided between the two network layers defined by the commercial standard, the physical and MAC layers. This study concludes that there are considerable vulnerabilities at both network layers, the most significant for a military application, however, are those associated with the physical layer and therefore alternate physical layer solutions should be sought for tactical wireless networks of the future.

BUSINESS ARCHITECTURE MODEL FOR NETWORK CENTRIC SURFACE COMBATANT LAND ATTACK WARFARE

William K. Shafley, III-Lieutenant, United States Navy
B.A., Miami University, 1994
Master of Science in Information Technology Management-September 2001
Advisors: Erik Jansen, Graduate School of Business and Public Policy
Floyd Brock, Department of Information Sciences

Land attack is a major mission area for the surface navy in the coming years. High levels of complexity characterize the land attack environment of 2015. The purpose of this research is to generate an understanding of the warfare architecture the land attack C4ISR-T systems will support. The *Business Architecture Model for Network Centric Surface Combatant Land Attack Warfare* depicts a networked resource structure of sensor, weapons, and decision makers that are transformed in a value added engagement process to achieve land attack goals. This structure was developed using the Eriksson-Penker Business Extensions Tool Kit for the Unified Modeling Language (UML). The Eriksson-Penker Business View comprises the Business Vision, the Business Structure, the Business Process, and the Business Behavior. The *Business Model for Network Centric Surface Combatant Land Attack Warfare* uses this structure to view the land attack warfare architecture in terms of goals and problems, resources, processes and events, and system wide behavior.

DEVELOPING AND IMPLEMENTING AN ARMY-SPECIFIC INFORMATION TECHNOLOGY MANAGEMENT CURRICULUM AT THE NAVAL POSTGRADUATE SCHOOL

Ann L. Summers-Captain, United States Army
B.S., Southwest Missouri State University, 1992
Master of Science in Information Technology Management-September 2001
Advisor: Floyd Brock, Department of Information Sciences
Second Reader: LTC Joseph Andrade, USA Department of Defense Analysis

As the Department of Defense and the Army move into the 21st Century, the need for quality trained Information Systems Management officers, or Functional Area 53 (FA53) officers, is becoming more and more important to meet the demands of the technologically advanced battlefield. These officers are called upon to manage increasingly complex information systems while maintaining an understanding of the limitations imposed by external factors such as the communications systems on which these information systems reside. To ensure Advanced Civil Schooling (ACS)-educated FA53 officers are receiving an education that enables them to function as a fully qualified FA53 officer, this thesis analyzes a series of related areas. This thesis first addresses the military and civilian ACS institutions from which a FA53 officer may receive an advanced degree in the Information Technology (IT) discipline. This thesis will also address the FA53 task list and directly compare this list with the IT curricula at these institutions. Additionally, this thesis will explore the possible implementation of an Army-specific Information Technology Management curriculum at the Naval Postgraduate School (NPS), the potential increase in Army instructors at the NPS to support such a curriculum, and the necessary procedure for periodic updates to the curriculum.

BANDWIDTH REQUIREMENTS FOR THE ADVANCED AMPHIBIOUS ASSAULT VEHICLE (AAAV) COMMAND VARIANT

James P. Wedge-Major, United States Marine Corps
B.A., Michigan State University, 1986
Master of Science in Information Technology Management-September 2001
Advisors: John Osmundson, Department of Information Sciences
David V. Adamiak, Department of Electrical and Computer Engineering

The goal of this thesis is to identify the bandwidth requirements for the command variant of the Advanced Amphibious Assault Vehicle (AAAV). The work focuses on the network established to support an infantry battalion COC. At the center of this network will be the AAAV(C). All higher and subordinate communications links that connect directly with the AAAV(C) are modeled. The intent is to identify all

traffic received and transmitted through the AAAV(C). Current systems are not discussed, as this study is intended to be independent of current system characteristics. The model is based on Internet Protocols (IP), with all communications, including voice and video, routed via IP addresses. This model attempts to provide better fidelity for future requirements analysis. Data on message size and transmission interval are identified that will allow grouping and analysis of message sets for future systems. Doctrinal messages appropriate for each node (unit) are identified and each message is then assigned a size (bits), and a transmission interval (minutes). Using a maneuver ashore scenario, network traffic flows for a 24-hour period are modeled with the software simulation tool Extend™. The model is then optimized and the minimum bandwidth required to support the scenario is identified.

A TRAINING FRAMEWORK FOR THE DEPARTMENT OF DEFENSE PUBLIC KEY INFRASTRUCTURE

Marcia L. Ziemba-Lieutenant, United States Navy
B.S., Marquette University, 1993
M.G.A., University of Maryland University College, 1996
Master of Science in Information Technology Management-September 2001
Advisors: Cynthia E. Irvine, Department of Computer Science
Daniel F. Warren, Department of Computer Science

Increased use of the Internet and the growth of electronic commerce within the Department of Defense (DoD) has led to the development and implementation of the DoD Public Key Infrastructure (PKI). Any PKI can only serve its intended purpose if there is trust within the system. This thesis reviews the basics of public (or asymmetric) key cryptography and its counterpart, symmetric key cryptography. It outlines the DoD's PKI implementation plan and the user roles identified within the infrastructure. Because a PKI relies entirely on trust, training for all users of a PKI is essential. The current approach to PKI training within the DoD will not provide all of its users with the required level of understanding of the system as a whole, or of the implications and ramifications that their individual actions may have upon the system. The decentralized, segmented, and inconsistent approach to PKI training will result in a lack of trust within the PKI. Training for the DoD PKI must be consistent, current, appropriate, and available to all users at any time. The author proposes a web-based training framework for the DoD PKI. The basic requirements and design of the framework are presented, and a prototype is developed for further testing and evaluation. Without the proper attention to training, the DoD PKI will be at risk, and may not perform its intended functions of providing the required authenticity and integrity across the various networks upon which DoD conducts business.